PALAIARGIA TRAUNAE SP. N. (ODONATA: PLATYCNEMIDIDAE), A NEW IDIOCNEMIDINE DAMSELFLY FROM PAPUA NEW GUINEA

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Abstract

A new species of damselfly, *Palaiargia traunae* sp. n. from Trauna Gap near the Baiyer River Sanctuary in Western Highlands Province, Papua New Guinea, is described and its relationships discussed. It represents the 25th species of the genus, which is confined to the island of New Guinea, the Moluccas and some intervening islands.

Introduction

The genus *Palaiargia* Förster, 1903 presently includes 24 species confined to the island of New Guinea, Misool and the Moluccas. All are relatively stout, medium-sized to large damselflies, often with brilliant colouration (Kalkman and Orr 2013). When erecting the genus, Förster (1903) regarded it as having affinity with the New World coenagrionid genus *Argia* Rambur, 1842, a relationship which was accepted by Ris (1915) and Lieftinck (1938). Lieftinck (1938) redefined the generic characters of *Palaiargia* when erecting the new genus *Papuargia* Lieftinck and placed both in the Coenagrionidae.

Recent molecular analysis (Dijkstra *et al.* 2013a) places the genus in the subfamily Idiocnemidinae of the family Platycnemididae and it is this classification that is presently adopted by consensus among odonatologists (Dijkstra *et al.* 2013b). The subfamily occurs in New Guinea, the Solomon Islands, the Moluccas and the Philippines. The other platycnemidid subfamily occurring in New Guinea is the widespread Disparoneurinae, which includes all Old World species previously placed in Protoneuridae, represented in New Guinea and Australia by the genus *Nososcticta* Selys. Together with the related New Guinean endemic genera *Papuargia*, *Hylaeargia* Lieftinck and presumably *Archboldargia* Lieftinck, *Palaiargia* differs from other New Guinean members of the subfamily in lacking crenulated margins to the wingtips and probably represents a natural subdivision within the group.

Recently, one of us (SJR) collected from the Trauna River Valley of Papua New Guinea's Western Highlands Province, two male specimens of a new species which we place in *Palaiargia* and describe below. In doing so we note that it does not completely fit Förster's (1903) or Lieftinck's (1938) diagnoses for that genus, but feel that the only reasonable alternative, to erect a new genus, would be premature. Terminology follows Westfall and May (2006), with the exception of anal appendages, where we follow Watson *et al.* (1991). The acronyms SAMA, South Australian Museum and QM, Queensland Museum are used to indicate type deposition.

Palaiargia traunae sp. n.

(Figs 1, 2a-g)

Material examined. Holotype ♂, PAPUA NEW GUINEA: Western Highlands Province, Trauna River Valley, 05° 29.118'S, 144° 14.226'E, 1,618 m asl, 16.xi.2013, leg SJ Richards, deposited in SAMA # 07-000985. *Paratype* ♂, same data as holotype but 17.xi.2013, deposited in QM, Registration no T196316.

Diagnosis. A medium-sized, moderately robust damselfly with a fairly short abdomen and narrow hyaline wings; ground colour dark with extensive pale blue-green markings on the synthorax and head and bright cerulean markings on the head, prothorax, base and tip of abdomen. Legs with long dense spines. Wings with moderately dense reticulation; distal margins smooth. Superior appendages long and attenuated, branched twice medially and curved sharply downwards terminally like claws. The species can be identified at once by its colouration (Fig. 1) and distinctive terminalia (Figs 2d-f).

Fig. 1. *Palaiargia traunae* sp. n., paratype male photographed in life at Trauna Gap on 17 November 2013 (S.J. Richards).

Description of holotype. Head: Labium very pale blue to pale ochreous except for tips of lateral lobes which are brown to black; medium lobe with short and narrow terminal cleft; anterior margins bearing dense long brown setae. Above (Fig. 2a), labrum pale greenish yellow with basal dark margin from which arises a thin spatulate bar reaching more than halfway to anterior margin; outer margin very narrowly brown. Outer face of mandibles, antefrons and genae similarly coloured to nearly level of antennal base; colour extending a little higher on the genae. Clypeus black. Frons somewhat

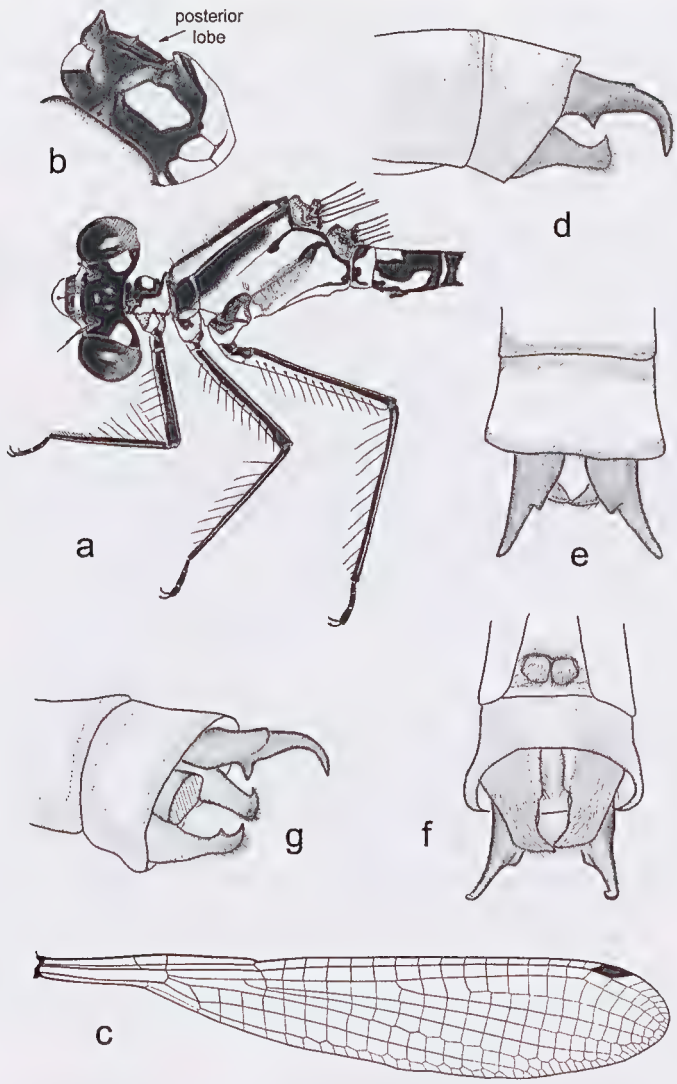

Fig. 2. *Palaiargia traunae* sp. n., holotype unless specified: (a) partial habitus showing head in dorsal view, thorax and basal abdominal segments in profile; (b) detail median and posterior lobe of prothorax; (c) right hindwing (paratype); (d-g) terminal appendages: (d) in profile; (e) dorsal view; (f) ventral view (slightly oblique); (g) oblique dorso-posterior view, left superior ablated, revealing bifid apex of inferiors.

bulbous with two slight prominences laterally, separated from the vertex by a rounded concave angle, bearing a tuft of long dense setae on either prominence. Remainder of head black except for two large postocellar blue spots broadly contiguous with the eye margin. Eyes in life black with posterior part a rich blue (Fig. 1). Antennae long and slender with second segment about twice length of first and equal to remaining segments combined.

Thorax: Prothorax (Figs 2a-b) black with bright blue markings; in profile with deep 'v' shaped incision between anterior and median lobes; anterior lobe black; dorsum of median lobe raised and bearing paired prominences each of which bears a transversely elongated blue spot on its posterior half; sides of median lobe somewhat nodular and with extensive blue marking, well separated from dorsal spots; blue area sweeping up to a point posteriorly to outflank the posterior lobe and thus forming two short dorsal, internally dark projections at level of posterior margin of posterior lobe; posterior lobe black, short and narrow with slight median projection on posterior margin. Synthorax (Fig. 2a): mesepisternum dark brown marked with broad, pale blue-green, slightly infuscated antehumeral band tapering slightly posteriorly. Laterally pale cerulean blue with dark brown markings; broad dark band covering all but upper one fifth of mesepimeron and a thin pale line bordering interpleural suture; continuing to mesinfraepisternum except for small blue patch at its posterior corner. Narrow, dark, spatulate line extending down from antealar carina along two-fifths length of interpleural suture. Metepisternum and metepimeron mainly blue, but with moderate infuscation from the metapleural suture across much of lower part of metepimeron, contiguous with dark brown streak along suture in upper part of metepisternum; dark brown area continuing across anterior two-thirds of metinfraepisternum, the remainder of which is blue. Venter pale blue. Legs long, bearing long black setae on femora and tibiae; coxae mainly blue with small irregularly rounded, outer, basal black patches; remainder of legs black except for broad, pale blue streak of flexor surfaces of femora which stops just short of apex and continues over trochanters to coxae as a continuous band of colour. Wings (*cf.* Fig. 2c) long and narrow with tips rather acute. Wing membrane overall with light brownish tint; venation normal for genus but rather dense; Px – 17,16:16,16; pterostigmata black, in both wings kite shaped, the long axis directed apicad.

Abdomen: Mainly dark with bright cerulean blue markings; expanded at S1, S2 and from S8-S10, especially evident in dorsal view. S1 (Fig. 2a) blue postero-laterally and ventrally with irregular margined, black, antero-lateral mark reaching apex of tergite broadly on dorsum; S2 (Fig. 2b) with paired, large, squarish basal blue marks dorsally and ventro-laterally with long, blue streak with irregular margins not reaching hind margin of tergite; S3-S5 with paired elongated baso-lateral blue marks becoming faint in S4-S5. S6-8 completely black. S9-S10 black with large blue dorsal patches occupying all

but narrow basal and distal margins in both segments. S9-10 distinctly clubbed and slightly dorso-ventrally flattened with S10 a little down-turned. Appendages (Figs 2d-g) entirely dark. Superiors slightly longer than S10, in basic structure claw-like, tapering gradually to thin point and strongly down-turned apically, bearing a short, blunt, inner dorsal process medially and a sharp, robust, ventral process slightly basad of this; in dorsal view tips are distinctly divergent (Fig. 2e). Inferiors reaching to about mid-point of superiors, robust, in profile (Fig. 2d) broad basally, somewhat tapered apically, terminating in a single broad upward pointing spine. This conceals a second inner spine (Fig. 2g), subequal to the outer one, the whole forming a broadly forked scoop-like process. Inferiors bearing dense setae, especially apically and on baso-interior margin.

Measurements: forewing, 25.5 mm; hindwing, 24 mm; abdomen + appendages, 32.5 mm.

Variation in Paratype. The single paratype (Fig. 1) is a younger specimen with slightly more extensive pale colouration on the thorax and abdomen; on S2 the ventro-lateral blue and the dorsal blue areas coalesce. The specimen is slightly smaller (hindwing 23.5 mm, abdomen + appendages 31.5 mm). The wings are not tinted brown and the post nodal index is Px – 18,15:15,18.

Etymology. traunae: a noun in the genitive case treating *trauna* as a Latin noun. Named after the type locality.

Habitat and biology

The new species was found along a small, very steep and clear rocky stream that intersects the road from Baiyer River to Jimi Valley in close proximity to Trauna Gap in the Trauna River Valley. The lower montane rainforest on adjacent slopes was reasonably intact, but many trees along the stream had been cleared so the canopy was fairly open. Both specimens were captured when they descended from the canopy during short periods of sunshine to perch on vegetation and debris at the top of a large, rocky waterfall. The species appeared to be uncommon; no additional specimens were observed despite more than 6 hours of sampling over two days at this site.

Remarks

The new species has no obvious near relatives. The male stands out particularly in the unique structure of its prothorax and of its terminal appendages. It shares long, slender, densely reticulated, acuminate wings and a slightly compressed and down-turned abdomen tip with the recently described *Palaiargia quandti* Orr, Kalkman & Richards, 2014 (Orr *et al.* 2014) but in other respects it is very different. *Palaiargia quandti*, another outlier in the genus, has quite unique appendages and an unusual, but quite different posterior lobe on the prothorax. Lieftinck (1938) redefined the diagnosis of *Palaiargia*, including the condition 'male superior appendages unarmed'. This character is a little misleading as even in 1938 species with a

strong baso-ventral spine on the superior appendage were known, but no species yet described bears any significant processes on the apical three-quarters of the appendage. Nevertheless, there are some similarities between the appendages of *P. traunae* and *P. perimecosoma* Lieftinck, 1957 from Halmahera and Batjan. In the latter the terminal segments of the abdomen are also strongly expanded and S10 is slightly depressed, and the superior appendages are long, tapered and diverging (but not down-curved) with a very slight sub-medial inner process. The inferior appendages show some similarity to those of *P. traunae* and also stand in similar relationship to the superiors. The markings of *P. perimecosoma* are quite similar to those of *P. traunae*, but the wings are short and broad, there are significant venational differences and the abdomen is extremely long. It is clear from Lieftinck's (1957) figures that the posterior lobe of its prothorax, while unusual, does not exhibit modifications homologous with those found in *P. traunae*. In describing *P. perimecosoma*, Lieftinck (1957) wrote 'Without knowledge of several of the more aberrant members of *Palaiargia*, one would perhaps be inclined to place it in a genus of its own: but ... *optata* (Hagen) and *obiensis* sp. nov. (both from the island of Obi), neatly bridge the gap between *perimecosoma* and the *rubropunctata-stellata* cluster of species, from the western part of New Guinea.' No such transition is obvious between *P. traunae* and any other *Palaiargia* species, but we nevertheless feel it retains sufficient characteristics typical of the genus, which includes several aberrant forms, to be placed within it.

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